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Særaftryk af Universitetets Festskrift til Hans Majestæt Kong Oscar II
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ON

CHLAMYDOSELACHUS ANGUINEUS, GARM.,

A REMARKABLE SHARK

FOUND IN NORWAY 1896

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WITH 2 PLATES

In the Autumn of 1896, the Zoological Museum of the Christiania University received a specimen of a large kind of shark, which in many respects, is the most noteworthy addition to the Norwegian fauna that has been obtained of late decennaries.

In the month of August of that year, a strange sort of fish was caught at Bugønæs in the Varanger Fjord, it having become entangled in a net which had been set at a depth of some 150 fathoms. The specimen was conveyed to Vadsø, and taken on board the corvette „Ellida", which was stationed there at the time, and purchased by Commander Salvesen of that vessel, who forwarded it to the University Museum.

It proved to be a *Chlamydoselachus anguineus,* one of the most remarkable of all existing sharks, a species which has but lately been discovered and described, and of which only some few individuals have hitherto been met with. As the name implies, the body is of a lengthened, snake-like form, and the opercular flaps are different to those of all other species of shark, in that they are continuous and free across the isthmus, where they form a connected fold embracing the head as if with a collar.

The dentition is also remarkable, and in this respect it does not resemble any present kind of shark. The teeth are arranged in separate rows which lie transversely in the jaws, each tooth forming three equally long points directed backwards, fine as needles, and there are five such teeth in each of the forty to fifty rows of which the dentition consists.

The great interest attached to this species, and which makes it one of the most remarkable of living fish, consists in its connections, it not being closely related to any present variety of shark, or to any that have become extinct in later periods of the Earth's existence, but whose ancestors belonged to the oldest palæozoic formation — the Devonian — when there lived forms of sharks whose teeth were comparatively of the same nature as those of the present specimen.

No known vertebrate has thus its nearest kindred so far back towards the dawn of organic existence. In other words, *Chlamydoselachus* is „the oldest of all living types of vertebrata“.

In 1884, *Chlamydoselachus anguineus,* was first described by Dr. Garman (Bull. Essex Instit., Salem Jan. 1884) from a large, but imperfect female individual, which was purchased in a miscellaneous lot of alcoholic specimens by the Museum of Comparative Zoology at Harvard College (Cambridge, Mass.) from Professor H. A. Ward, who had secured it in Japan.[1] The specimen was not in a good state of preservation, most of the viscera being absent, and the end of the tail wanting. Its total length may be estimated at about 1580 mm.[2]

Dr. Garman's preliminary description of the species, which is comparatively lengthy, concludes with the following words:

„There is a certain embryonic look about the species, as others who have seen it also remark, that calls for a comparison with fossil representatives of the Selachians. Among them I have been unable to find anything which might be considered at all near. In *Cladodus* of the Devonian, there is a form with teeth somewhat similar . . . . However, the type is one which produces the impression that its affinities are to be looked for away back, probably earlier than the Carboniferous, when there was less difference between the sharks and the fishes.“

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[1] As stated later on (p. 7) the species had been discovered in Japan a few years previously, and forwarded to Dr. Döderlein of Strassburg, who, so early as 1882, wrote an account of the fish, which was not, however, ever published.

[2] The length is stated to have been 59.5 inches, to which must be added the end of the tail which was wanting, which end was, probably, of a length of about 2 inches, this giving a total length of some 61½ English inches.

Garman's views as to the relationship of the new species produced, during the course of the year, a discussion between him and a few of the American ichthyologists, who however finally agreed in the main with the conclusions of Dr. Garman.

Thus Professor Cope (Science, March 7th 1884) pointed out that *Chlamydoselachus* belonged directly to his genus *Didymodus,* „which had hitherto been supposed to be confined to the Carboniferous and Permian period,“ and in conformity to his views, he named it in his next treatise (American Naturalist, April 1884) *Didymodus anguineus.* In two reports (Science, March 21th and April 11th 1884) Professor Gill declared himself to be so far of Cope's opinion, that he asserted that *Chlamydoselachus* did have a representative in the Carboniferous genus *Diplodus,* Agass. (= *Didymodus,* Cope), but was convinced, not only that the last genus had no generic or even family relations with *Chlamydoselachus,* but that it represents even a different order. On the other hand, according to his opinion, *Chlamydoselachus* was not either closely related to *Chladodus,* as assumed by Garman. In a fresh treatise (Science, May 30th 1884) Professor Cope abandoned his position concerning the affinities of the two genera *Diplodus (Didymodus)* and *Chlamydoselachus,* chiefly on the ground of the construction of the dorsal fin, but he, nevertheless, continued to be of the opinion (Palæontol. Bull. No. 38. July 1st 1884) that the difference in the dentition was not greater than that the two relations in that respect should be regarded as one. „This is an interesting discovery, indicating that this genus, and not *Ceratodus,* is the oldest type of vertebrate now known in a living state.“

After having published several minor contributions explanatory of his new species, in reply to the observations of Professors Cope and Gill, Garman published, in 1884, a new and detailed account of the specimen (Bull. Mus. Comp. Anat. Harv. Coll. Vol. XII, Cambr. July 1885), accompanied by a series of plates which represented the most important features of the outer construction of the species, as well as of its anatomical characteristics so far as they could be derived from the specimen, which in several respects was in an incomplete condition. In that account, the Author sets forth his views that his species is a type of an entirely new family, *Chlamydoselachidae,* which amongst fossil forms is most nearly related to *Cladodus mirabilis,* Agass. from Middle Devonian, and regards it thus as proved that the Cladodonts were true sharks, and that the primitive form connecting them with the fishes is to be sought further back in the Devonian or in the Silurian.

The next contributions to our knowledge of this species was given by Dr. Günther, who in 1887, in his large work on the reports of the deep sea fishes collected by the Challenger Expedition[1] gives supplementary details of its outward and internal construction from 3 well preserved specimens, which were, likewise, obtained off Japan (Yeddo Bay, Tokio). Two of them were males, the longer being about 1474 mm., in length (thus about the same size as Garman's typical specimen); the third was a female (eviscerated).

Dr. Günther's remarks are accompanied by two plates, representing the species in a complete condition. The tail will be seen to terminate in a point, in conformity with those of most of the other recent sharks, whilst in Garman's figure it terminated in a slanting line, as copied from a fractured surface.

Furthermore various portions of the body are described, the construction of which could not be observed in the typical specimen. These were chiefly the two claspers, whose construction agreed in the main with that found in members of the family *Notidanidae;* and the stomach, liver, testicles, and *conus arteriosus.* Detailed descriptions are given, moreover, of the dentition, and show, *inter alia,* how the minute teeth in the inner series, differ very little from the enlarged papillæ of the surrounding skin. Each anterior series in these 3 specimens consisted of six, the posterior ones of five teeth, to which, generally, from 1 to 3 in an immature state of development are added.

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[1] Report Scientif. Res. Voyage Chall. 1873—76, Zoology, Vol. XXII (1887).

A few times subsequently, the species has been made the subject of special anatomical investigations. In 1889, Dr. Ayers[1] made a report of his investigations „On the Morphology of the Carotids, based on the study of the blood vessels of *Chlamydoselachus anguineus.*“ As the results of his studies (which probably were made on the type specimen) the Author can indicate several peculiarities in the construction of the blood vessels of this species, all of which show a lower, more primitive condition of organisation; in fact *Chlamydoselachus* holds undisputed claim to be the most lowly organized elasmobranch yet discovered.

In 1895, Dr. Rose gives a detailed account of the development of the teeth in this species[2].

His investigations were made on an embryo, of a total length of 340 mm., which had been removed from a female, which, with another specimen of the same species, had been caught, so early as 1881, in the bay of Tokio, Japan, and obtained by Dr. Döderlein of Strassburg. In 1882, the latter Author, drafted a description of that, hitherto, quite unknown species, which, however, was never published. The two specimens were, finally, secured by the Museum at Vienna, where they are still preserved. In the above mentioned treatise, Dr. Rose deals with the construction of the scales and the teeth, which, on the whole, agreed with that of the old specimens. On the other hand, he was able to prove, from the still immatured teeth, that each of the 3 points, of which a tooth apparently consists, represents a separate tooth, as they sprang from separate bases, and only by subsequent coalescence did these form the three pointed tooth.

Dr. Rose adds, moreover, a supposition, based on his study of the fine construction of the dentine, that *Chlamydoselachus* is not, as presumed by Garman, most closely allied to the species *Cladodus,* but that it is more nearly related to the *Xenacanthus*[3], belonging (as does the *Cladodus*) to the palæozoic family *Xenacanthidae.*

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[1] Bull. Mus. Comp. Zool. Harv. Coll. Cambr. Vol. 17, p. 192.

[2] Morphologische Arbeiten, B. 4, p. 192 (Jena 1895).

[3] Zittel, Handbuch der Paläontologie, III B. p. 88 (München u. Leipzig 1887—1890).

Up to the year 1890, the species had not been discovered beyond Japanese waters. In that year the Author received a small collection of fishes for examination, collected in 1889 and 1890, off Madeira, by the Prince of Monaco. Amongst these (most of which had been purchased from fishermen at Funchal) was a specimen of *Chlamydoselachus,* the smallest hitherto known. This specimen, which, however, was not in good condition, the bowels being absent, and the entire individual greatly contracted, was of a total length of 610 mm. (or 24 English inches), and has been more fully described in Bull. Soc. Zool. France 1890, p. 218 (Paris 1890).

Notwithstanding that *Chlamydoselachus,* through this latest discovery, thus proves to frequent the waters of almost similar latitudes in the two hemispheres of the globe, there did not appear to be any more essential difference between the new Atlantic specimen and those from Japan, than that which may be presumed to arise from the youth of the individual, and there was no ground for classing the new specimen as a distinct species. This result too was not unexpected in such a solitary type of Vertebrates.

This species was not subsequently met with in Atlantic waters, until the specimen, which forms the subject of this article was discovered astray in that portion of the Arctic Ocean which washes the Norwegian coast, thus proving the truth of the remarkable phenomenon which has often been previously observed and mentioned, that, unaffected by latitude or parts of the Earth, there exist forms of animal life which appear unchanged at great depths in all waters where like temperatures exist, whether under the Equator or up under the Poles.

Only this one species of the genus *Chlamydoselachus,* is thus known to exist at the present day.

In 1876, the teeth of a *Chlamydoselachus* were found by R. Lawley in the pliocene layers in Tuscany. On the basis of these teeth, Mr. Davis, in 1887, described the species (Proc. Zool. Soc. Lond. 1887, p. 542) under the name of *Chlamydoselachus lawleyi.* This has been either identical with *Chl. anguineus,* or been closely related to it.

At present, so far as is known, there are at least 15 specimens of *Chl. anguineus* preserved in the different museums of Europe and America.[1]

Although, at present, the genealogical tree of this species cannot be drawn with certainty, it can hardly be doubted that amongst sharks of the present period, those of the Notidanus-group, approach nearest to it, within which the genus *Hexanchus* of the family *Hexanchidae* as well as *Chlamydoselachus* possess 6 branchial openings. But although the above mentioned group occupies a peculiar position amongst recent sharks, *Chlamydoselachus* differs likewise so greatly from the hitherto known forms of that group, that it undoubtedly ought to form, as proposed by Garman, so early as 1884, a separate family, *Chlamydoselachidae;* and younger American scientists have placed it under the extended group of the Notidanes, *Diplospondyli,* Hasse, an order which includes the most archaic types of the subclass *Selachii.*

The synonymy of the species is, on the whole, the following:

Fam. **Chlamydoselachidae.**

Chlamydoselachus anguineus, Garm. 1884.

1884. *Chlamydoselachus anguineus,* Garm. „An Extraordinary Shark", Bull. Essex Inst. Vol. XVI, Jan. 17th, p. 3 (Salem 1884), *Japan.*

1885. *Chlamydoselachus anguineus,* Garm. „A living species of Cladodont Shark", Bull. Mus. Comp. Zool. Harv. Coll. Cambr., Vol. XII; No. 1, p. 1; Pls. I—XX(Cambr. Mass. July 1885).

1887. *Chlamydoselache anguinea,* Günth., Rep. Scientif. Res. Voy. Challenger 1873—1876, Zoology, Vol. XXII, p. 2, Pls. LXIV, LXV (Edinb. 1887). *Japan.*

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[1]

Mus. Vienna	2 Specimens	Tokio 1881.
Mus. Cambridge, (Mass.)	1 Specimen (type) (Length female 1580 mm)	Japan 1884.
British Museum	3 Specimens (Length male 1250 mm., male 1390 mm., female 1474 mm)	Tokio (1887).
Mus. Prince Monaco	1 Specimen (Length female jun. 610 mm.)	Madeira 1889.
Anatom. Instit. Moscou	2 Specimens	Japan?
Mus. Zool. Liège	1 Specimen (Length 1600 mm.)	Japan.
Mus. Hist. Nat. Bruxelles	1 Specimen (Length 1350 mm.)	Japan.
Böhm. Mus. Prag	1 Specimen (Length 950 mm.)	Japan.
Mus. Fritsch, Prag	1 Specimen (Length about 1500 mm.)	Japan.
Mus. Acad. Imp. Petersb.	1 Specimen (Length female 1520 mm.)	Japan.
Mus. Christiania	1 Specimen (Length female 1910 mm.)	Norway 1896.

My thanks are due to Dr. Boulenger (British Museum), Professor v. Beneden (Liège), Dr. Dupont (Brussels), Professor Ant. Fritsch and Dr. V. Fritsch (Prague), and Dr. Büchner (St. Petersburg), for the information they have supplied to me concerning the size and sex of several of the above mentioned specimens.

1889. Ayers, „On the Morphology of the Carotids, based on the study of the blood-vessels of *Chlamydoselachus anguineus*“, Bull. Mus. Comp. Zool. Harv. Coll. Cambr., Vol. XVII, p. 192 (Cambr. Mass. 1889).

1890. *Chlamydoselachus anguineus,* Coll. „Sur quelques Poissons rapportés de Madère par le Prince de Monaco“, Bull. Soc. Zool. France, 1890, Tome XV, p. 219 (Paris 1890). *Madeira.*

1895. Rose, „Über die Zahnentwicklung von *Chlamydoselachus anguineus,* Garm.“ Morphol. Arbeit., B. 4, p. 192 (Jena 1895). *Japan.*

1895. *Chlamydoselachus anguineus,* Goode and Bean, Oceanic Ichthyology, p. 22, Pl. VI, No. 22 (Washington 1895).

1896. *Chlamydoselachus anguineus,* Jord. and Eversm. Descr. Cat. Fishes North Middle Am., Part I, p. 16 (Washington 1896).

1897. *Chlamydoselachus anguineus,* Coll. „Om en Del for Norges Fauna nye Fiske, fundne i 1880—1896,“ Arch. for Math. Naturv. B. XIX, No. 8, p. 10 (Christiania 1897). *Norway.*

The present specimen was caught in a net, at Bugønæs, in the Varanger Fjord (69° 45′ N. Lat.) on the 4th August 1896, which had been set at a depth of about 100 to 150 fathoms for catching coal-fish *(Gadus virens).*

As the general characteristics of the fish will be known from the more or less detailed descriptions which have been published, I shall just add a few remarks concerning the new individual, or as to how far it has to any extent supplied materials wherewith to supplement the previous descriptions.

The specimen was a fully developed female, its total length being 1910 mm.; thus it is the largest specimen of the species of which I have any knowledge. The largest of those from Japan, described by Dr. Garman and Dr. Günther, were females of a length of 1474 to 1580 mm., while the smallest was that from Madeira whose length was 610 mm.

The measurements were as follows:

Total length	1910	mm.
From point of snout to dorsal fin....	1260	„
From point of snout to ventral fins ..	990	„
Length of head (to the upper edge of the 1st gill opening)............	195	„
From point of snout to hindermost gill opening	260	„

Length of snout	48	mm.
Vertical diameter of eye	15	„
Longitudinal diameter of eye	28	„
From the eye to spiraculum	58	„
From the eye to the 1st gill opening	121	„
Mouth	132	„
Interorbital space	90	„
Height of the body	165	„
The base of dorsal fin[1] ....about	172	„
Greatest height of dorsal fin	45	„
From the dorsal fin to the tip of tail	485	„
From the anal to the tip of tail	470	„
Base of anal	245	„
Greatest height of anal	72	„
Base of ventral	205	„
Greatest height of the ventral	97	„
Greatest height of the tail across the caudal	135	„
Length of pectoral	165	„
Breadth of pectoral	85	„

The head of this individual, reckoned to the last of the gill openings, is thus contained 7.3 times in the total length of the body, and the height of the body 11.5 times. In the typical specimen, which was likewise a female, and whose total length was about 1580 mm., the height of the body was said to be contained nearly 15 times in the total length of the body, but as that specimen was wizened and shrunk, and wanted the end of the tail, the height was certainly somewhat greater originally.

In our specimen, it proved to be the enormous liver with its two large lobes, extending through nearly half the length of the body, which contributed to the comparatively great height of the body; and the statement made by Goode and Bean in their last great work, Ocean Ichthyology,[2] that one of the family characteristics is „Body increasing in size anteriorly," does not agree with the features of the Norwegian specimen. The greatest height of the body in this individual is found about half way between the tips of the pectorals and the commencement of the ventral fins, and is at this spot 165 mm., whilst the height gradually decreases both to the front and back, and at the hindermost gill opening is but 135 mm., or about the same as half way between the ventrals and the commencement of the anal. The height of the head, measured across the angle of the mouth, is about 110 mm.

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[1] The commencement of the dorsal fin is, in front, almost imperceptible, as its commencement is only indicated by some scales which are inconsiderably larger than the other scales of the body.

[2] Washington 1895 (p. 22).

The lens is situated above the space between the 5th and 6th rows of teeth in the upper jaw.

Branchial rays. On the branchial arches the number of rays are in our specimen as follows:

1st	branchial	arch	has	19	rays
2nd	—	„	„	14	„
3rd	—	„	„	12	„
4th	—	„	„	12	„
5th	—	„	„	11	„
6th	—	„	„	8	„

The teeth. In the specimen from the Varanger Fjord there are altogether 44 rows of teeth, there being in the upper jaw 11 on the right side, and on the left 12 rows.

The first row contains 5 (three cusped) teeth; the second to the tenth row, each 4 teeth; the eleventh and twelfth only 3 small teeth. But at the inner end of each row the outline is visible of one more (three cusped) tooth lying flat under the skin, with its cusps protruding but slightly above it, ready to replace the foremost tooth when shed.

The lower jaw contains one median row in front, and ten rows on each side. The teeth are almost similar to those of the upper jaw.[1]

Garman's typical specimen had 51 rows, each row containing 6 teeth (besides the innermost, not fully developed tooth). The specimens examined by Dr. Günther, had, as previously mentioned, also 6 teeth in each row.

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[1] In the present specimen the second side row of the left lower jaw is abnormal, being double (with two closely adjoining rows, all the teeth in them being somewhat smaller than normal teeth).

The construction of the teeth in our specimen was moreover in entire conformity with those of the typical specimen; and the teeth of the young specimen from Madeira, whose total length was only one third of that of the individual from Varanger Fjord, did not present any variation of importance. The number of teeth in each of its rows was 5; the two Atlantic individuals agree, on the whole, in all detailed respects with the specimen from Japan.

Lateral line. As in the type specimen, the lateral line has a depression just under the dorsal fin, and for the remainder of its course (along the tail), lies below the central line of the body. In the present individual this depression is on one side (the left) irregular, it having, on its (otherwise normal) lowered portion, a little sharp curve upwards.

The two approximated *ridges,* separated by a groove, described in the typical specimen as extending under the middle of the body, were indistinct in this specimen. It is possible that the liver becomes enlarged or diminished periodically, and may, occasionally, when it (as in the Norwegian individual) is very great, obliterate the two ridges and the intermediate groove.

The scales. I shall add the following notice to the descriptions given by Garman and Rose. The scales, especially on that portion above the lateral line, are turned slightly but perceptibly backwards, and therefore offer some slight opposition to the finger when drawn over them in a forward direction. This is less observable below the lateral line.

Along the dorsal line of the body (from the neck of the dorsal fin), the scales are somewhat larger than those on the other parts of the body (excepting the tail's), and the two keels which, on each scale, unite at an angle on the hindermost edge of the scale, are, in this specimen, more raised, especially at the point of the angle. On the whole they resemble the scales on the angles of the mouth, but are smaller.

The intestinal canal is almost straight throughout its entire length, only the short duodenum being turned aside between the pylorus and the dilated portion with the spiral valve.

The stomach proper is small, and proportionally narrow; its length is 340 mm., breadth about 45 mm.

The intestine (colon) is cylindrical, very muscular, and contains 47 spiral valves.

The pancreas consists of 2 large lobes, of which each is subdivided into an upper and lower portion, so that it really is in 4 divisions, of which the two hinder portions are lighter in colour than the front ones. On the right side it forms, first, a short light coloured lobe, about 80 mm. long and 35 mm. broad. Anteriorly, it is almost entirely separated from a curved front portion, which is of darker hue than the hinder part. Posteriorly there also exists a lower portion, of a length of about 100 mm.; above this lies a darker coloured portion whose length is about 48 mm., which adjoins the hinder lighter part, and is connected with it.

The liver was enormous, and weighed 4250 grammes.[1] It consisted of two parallel and symmetrical lobes, the symphysis being 140 mm., in length. Its total length was 950 mm., being thus nearly one half of the total length of the body.

The lobes were of an equal thickness, and without side lobes except towards the end, where there was a small side flap. The height of each lobe was 100 mm., and the thickness 55 mm.; their upper (dorsal) edge was somewhat flattened, almost lamellar, while the lower (ventral) edge was smooth and rounded.

The oviducts were extremely long, both being of about equal length. Towards their upper ends each expands to a uterus-like sack, of which the right is somewhat larger than the left; both contained immature eggs. Below this expansion the oviducts are quite narrow, but subsequently expand slightly downwards towards the abdominal pores.

The total length of each oviduct is about 900 mm.

The right „uterus“ was 240 mm. in length, and contained 10 large eggs, about the size of the yolk of a small hen's egg, but some varied in size. There were, besides, about 30 lesser yolks of the size of large and small peas, as well as a few bigger ones about the size of the yolk of a pigeon's egg.

The length of the left uterus was 220 mm., and it contained 5 large yolks, and about 20 small ones.

As previously mentioned (p. 7) it has been proved that *Chlamydoselachus* is viviparous.

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[1] Weighed two and a half months after the death of the fish, so that probably it had lost good deal of oil by that time.

The kidneys were also very long, the right being the longer (length 780 mm.) and rather flat, the left being more cylindrical, and of a length of 770 mm. Posteriorly, both kidneys form a club-shaped, thickened, coalescent portion terminating somewhat abruptly towards the anus. The length of the coalescent portion is 120 mm.

Entozoa.

The stomach was empty and did not contain any parasites. Amongst the spiral valves, on the other hand, there were hundreds of a small Cestoid; it was, besides, occupied by a single short and thick Trematoid.

These two species I forwarded to Dr. Lönnberg of Upsala to examine and describe, who in a letter of 15th March 1897, gives the following information: —

The Cestoids belong to the genus *Monorygma*,[1] but form a new species, for which he has proposed the name *M. chlamydoselachi*.[2] The Trematoid is probably *Distomum veliporum*.

Chlamydoselachus anguineus („the snake-like frilled shark") is without comparison the most lengthy of all existing sharks. When one regards the eel-like construction of its body, the almost serpentine head, its deeply cleft mouth, the frilled and protruding gill coverings and its formidable array of teeth which call to mind the python's, one's thoughts turn to that mythical creature, which with more or less regularity is annually described or even depicted in the columns of newspapers; whose existence, however, has never been confirmed; but which, as a rule, is believed in by all (except by naturalists), namely

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[1] Of the genus *Monorygma* there were, according to Dr. L., but two hitherto known species. One of these, *M. perfectum*, v. Ben., is ten times as large as the new species, and occurs in the intestines of *Somniosus microcephalus*, (Bl. Schneid.). This species has, too, been found by Dr. L. in specimens from Norway. The other species, *M. elegans*, Mont., resembles the new one in size, and has been found in the *Scyllium*-species in the Mediterranean.

[2] Dr. Einar Lönnberg: „Ein neuer Bandwurm (*Monorygma Chlamydoselachi* n. sp.) aus *Chlamydoselachus anguineus*, Garman" (Archiv for Math. og Naturvid. Bind XX, No. 2, Christiania 1897).

„the Sea Serpent"; and the *Chlamydoselachus,* in fact, appears to satisfy most demands of an ideal sea serpent.

But all hitherto known specimens of the *Chlamydoselachus,* are of more modest dimensions than allowed by the representations of the said monstre. The specimen from the Varanger Fjord, which is the biggest of all (so far as their measurements are known), was barely two mètres in length. It was, as previously stated, a female, with immature eggs in the oviducts, which at the time were in the course of development, and the specimen was thus apparently full grown. Nevertheless, it is by no means necessary to suppose that such a length is a limit to the dimensions to which it can attain. Many of our own kinds of fishes yield examples of individuals being capable of procreation whilst still (it may be said) in their youth.

It remains hereafter a question, which it will be most natural to all to put, whether there has been observed and really examined, a being which combines a bodily construction and appearance resembling that of the *Chlamydoselachus,* with the size of a „Sea Serpent" (or, in any case, one of moderate size).

American naturalists reply that such a being has been observed at least on one occasion. It has been caught, examined by a ship's crew, but again returned to the water, without science having been able to gain further particulars on which to base a judgment than the word of the master and crew, who, in this instance, deliberately threw away the opportunity of casting a light upon one of the most remarkable of marine animals that has ever been observed.

It was in the year 1880, that this extraordinary individual had become entangled in a net laid down by a fishing smack off New Harbour (Maine). It was dead when hauled on board, and proved to be a long, eel-like fish about 24 to 25 feet in length, with a flattened head, round body, and rough skin like a shark's. It had one dorsal fin, and many branchial clefts on each side of its head. It was examined by the crew during the course of quarter of an hour, but then thrown overboard as the skipper decided that „if I landed it, I should lose 20 dollars that day in my business, and so could not afford to bother with it."

Even 24 hours afterwards, the animal might have been obtained as it had sunk on a bank in but 4 fathoms of water; but a gale setting in, it could not afterwards be found.

A hitherto unknown marine monstre was thus on the point of being revealed to the knowledge of man, and subjected to scientific examination. All that we know about it is due to the attention called to it by an American journal, which led subsequently to correspondence between the skipper (S. W. Hanna of Pemmaquid) and Professor Spencer Baird of the Smithsonian Institution, and on which occasion the individual was, as far as it could be, described from memory.[1]

Although it is doubtful whether skipper Hanna's account was correct on all points, it can hardly be gainsaid that his individual was a large, unknown species of shark of an eel-like form, and of a length of 7 to 8 mètres.

Can it be that this eel-like shark from New Harbour was really a fully developed *Chlamydoselachus,* or is it possible that even at this present day there exists an unknown form of large dimensions possibly allied to that species?

These are questions which may be propounded as riddles which the future is called upon to answer.

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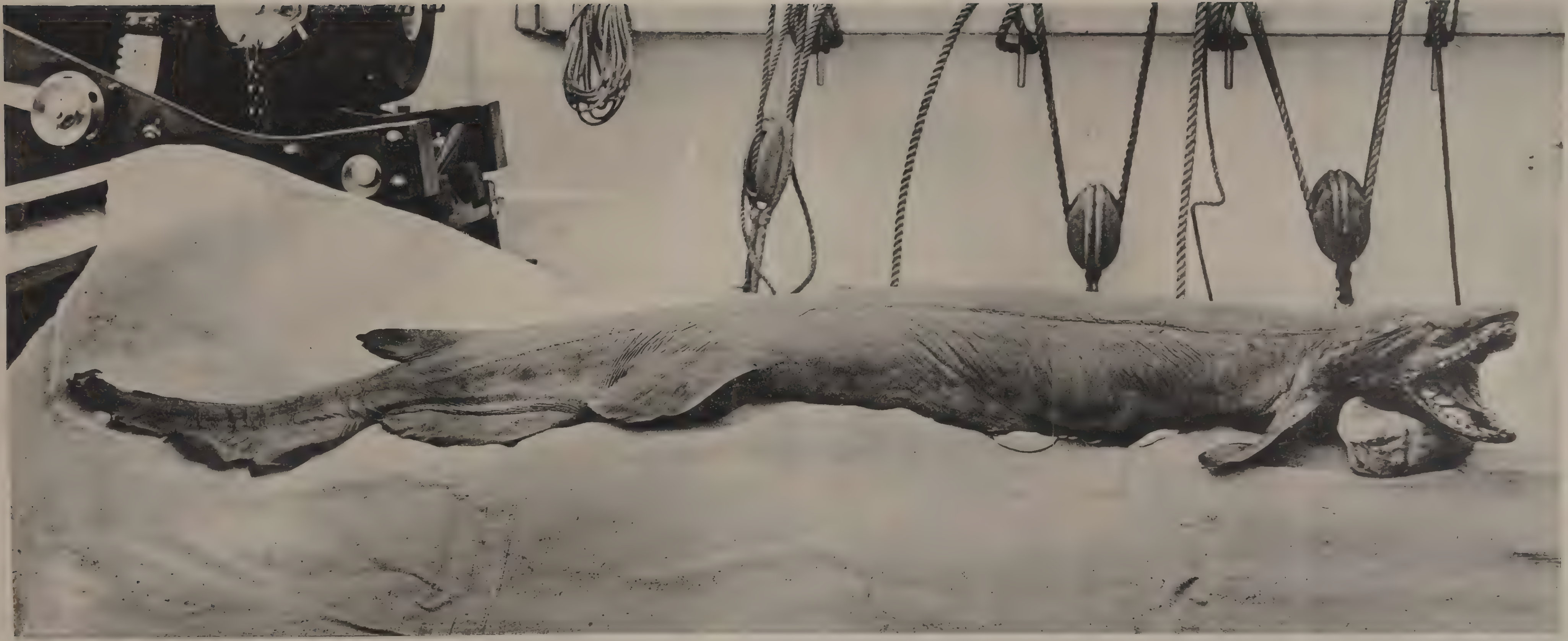
[1] Proc. U. S. Fish Commission, Vol. III, p. 407 (Washington 1883).



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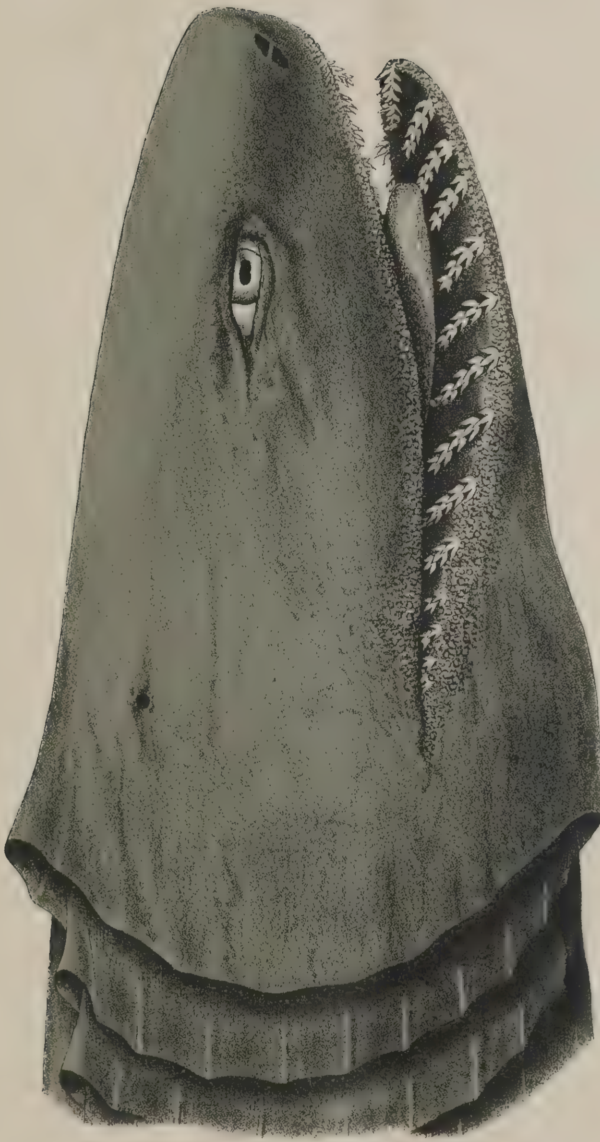

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